

June 2013

### Admissions for Total Knee Replacement among Montana Residents, 2002-2011

Cody L. Custis, MS, MHDDS

Total knee replacement is a procedure that replaces the ends of the femur and tibia with metal components. Osteoarthritis (ICD-9-CM Vol. 1: 715.xx) was the primary diagnosis for 97% of patients hospitalized for total knee replacement.<sup>1</sup> Total knee replacement may be used to treat osteoarthritis when non-surgical treatments such as exercise, weight control, and pain management do not provide sufficient relief.<sup>2</sup> Risk factors for osteoarthritis include excess body mass, injury to joints, and occupational risks.<sup>3</sup>

We examined inpatient admissions from 2002 through 2011 to Montana resident adults (aged 18 or more years) with principal procedure of total knee replacement (ICD-9-CM Vol. 3: 81.54).<sup>4</sup> For the hospitalization during which the procedure was performed, we searched for accompanying diagnoses of obesity (ICD-9-CM Vol. 1: 278.0x), personal history of injury (ICD-9-CM Vol. 1: V15.5x) and fracture, dislocation, sprain and strain injury codes to the lower extremities as comorbidities.<sup>5</sup>

The number of hospitalizations for total knee replacement nearly doubled from about 1,300 in 2002 to about 2,500 in 2011 (Figure 1). Fifty-nine percent of hospitalizations were to females. Obesity was a primary or secondary diagnosis for 15% of total knee replacement hospitalizations. Both personal history of injury and injury to the lower extremities were indicated in less than one percent of hospitalizations. Because personal history of injury coding was revised three times during the study period (in 2008, 2009, and again in 2010), this may reflect lack of documentation in the medical record and inability to assign specific codes, and therefore may not accurately count the contribution of injury to knee replacement.<sup>6</sup>

<sup>1</sup> <http://www.icd9data.com/>

<sup>2</sup> [http://www.niams.nih.gov/Health\\_Info/Osteoarthritis](http://www.niams.nih.gov/Health_Info/Osteoarthritis)

<sup>3</sup> <http://www.cdc.gov/arthritis/basics/osteoarthritis.htm>

<sup>4</sup> The Montana Hospital Discharge Data System (MHDDS) receives annual de-identified hospital discharge data sets through a Memorandum of Agreement with the Montana Hospital Association and the Montana State Hospital at Warm Springs. Most hospitals in Montana participate in voluntary reporting of discharge data from their Uniform Billing Forms, version 2004 (UB-04). The MHDDS receives information on more than 95% of the inpatient admissions in the state. It does not receive data on Emergency Department visits at this time. ; <http://icd9cm.chrisendres.com/>

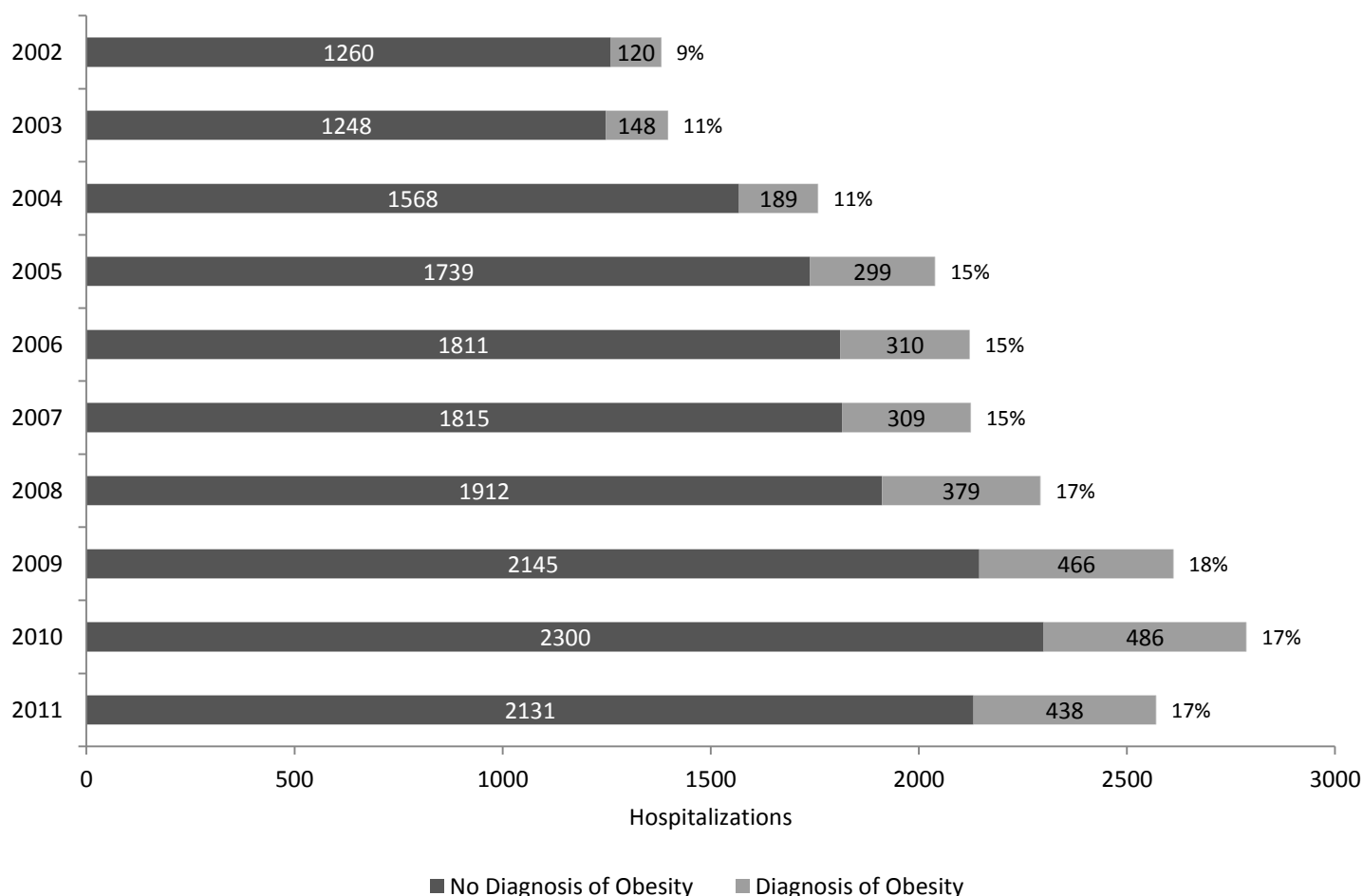
<sup>5</sup> Trends In Hospitalization With An Obesity Code, 2001-2010, Montana Hospital Discharge Data System;

[http://www.cdc.gov/nchs/data/ice/final\\_matrix\\_post\\_ice.pdf](http://www.cdc.gov/nchs/data/ice/final_matrix_post_ice.pdf)

<sup>6</sup> [http://www.cdc.gov/nchs/data/icd9/ICD9CM\\_FY13\\_CNVTBL.pdf](http://www.cdc.gov/nchs/data/icd9/ICD9CM_FY13_CNVTBL.pdf)

An accompanying diagnosis of obesity increased in numbers and as a proportion of hospitalizations for total knee replacement (Figure 1). In 2002, only 9% of hospitalizations for total knee replacement indicated obesity as a comorbidity; the percent of hospitalizations with obesity as a comorbidity was 17% in 2011.<sup>7</sup> Because obesity contributes substantially to the osteoarthritis process and also affects treatment, the presence of obesity should be well coded on hospitalizations for total knee replacement.<sup>8</sup>

Figure 1. Knee Replacement and Accompanying Diagnosis of Obesity,  
Montana Hospital Discharge Data System, 2002-2011

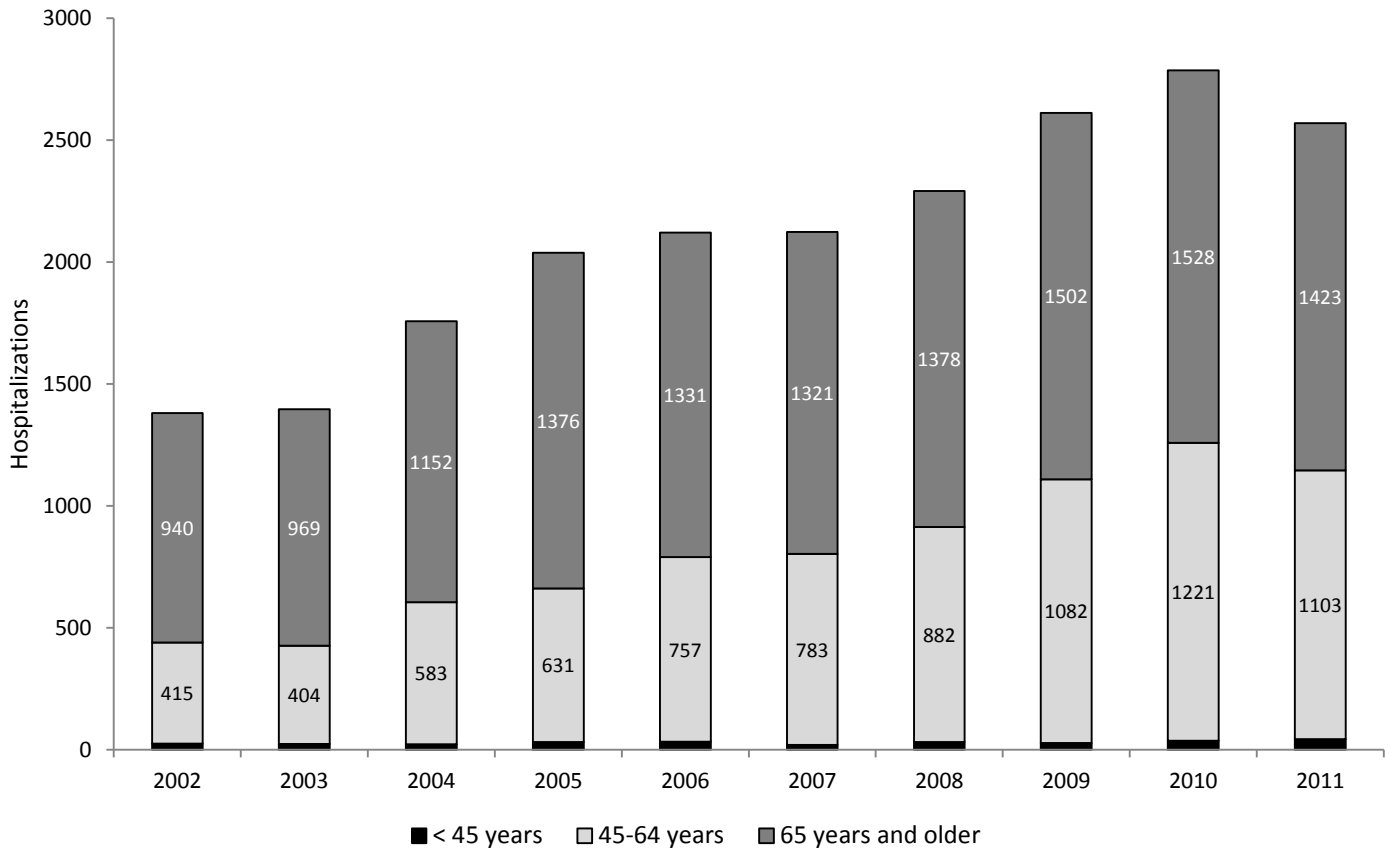


<sup>7</sup> Although obesity was expanded from a four digit code to a more specific five digit code on October 1, 2005, we were only interested in obesity as specified at the fourth digit; we did not see a large change in the percentage of hospitalizations when the coding change was implemented; <http://www.acpinternist.org/archives/2005/09/coding.htm>

<sup>8</sup> [http://www.hmsa.com/PORTAL/PROVIDER/zav\\_pel.fh.DIA.550.htm](http://www.hmsa.com/PORTAL/PROVIDER/zav_pel.fh.DIA.550.htm)

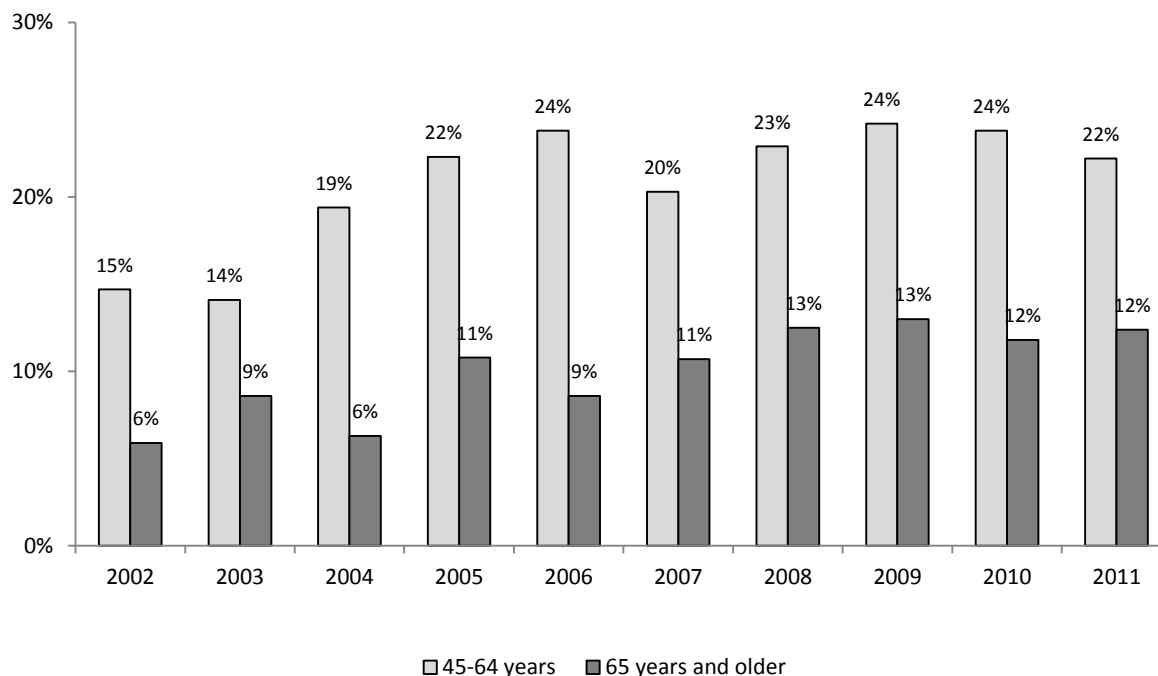
The percentage of procedures performed on persons aged 45 to 64 years increased, while the percentage performed on persons aged 65 years or more decreased (Figure 2). Hospitalizations for total knee replacement to individuals aged less than 45 years were uncommon.

Figure 2. Knee Replacement by Age Group  
Montana Hospital Discharge Data System, 2002-2011



Obesity was included as an accompanying diagnosis for a higher proportion of patients aged 45 to 64 years than of those aged 65 or more years and the proportion was higher for both age groups in 2010 and 2011 than in 2002 and 2003 (Figure 3).

Figure 3. Percentage of Knee Replacement Recipients Who Were Obese, by Age Group, Montana Hospital Discharge Data System, 2002-2011



From these data, we cannot determine if the increase in total knee replacement was due to increasing prevalence of osteoarthritis in general, or a larger proportion of patients with osteoarthritis who choose surgery as a treatment. However, it is likely that an aging population and a high prevalence of obesity among Montanans will be associated with further increase in the number of knee replacement surgeries among those with osteoarthritis.<sup>9</sup>

For information about the Montana Hospital Discharge Data System, please contact Cody L Custis, Epidemiologist, Office of Epidemiology and Scientific Support, (406) 444-6947 or [ccustis@mt.gov](mailto:ccustis@mt.gov)  
 This document was published in electronic form only. Alternative formats of this document will be provided on request.  
 Please visit our website at <http://www.dphhs.mt.gov/publichealth/epidemiology/index.shtml>

<sup>9</sup> <http://www.cdc.gov/obesity/data/adult.html>; <http://www.dphhs.mt.gov/publichealth/preventionopportunities/2009/MPHOctober2009.pdf>